

NON-PUBLIC?: N

ACCESSION #: 9003260545
LICENSEE EVENT REPORT (LER)

FACILITY NAME: OYSTER CREEK, UNIT 1 PAGE: 1 OF 4

DOCKET NUMBER: 05000219

TITLE: "Main Transformer Failure Causes Automatic Reactor Shutdown"
EVENT DATE: 07/11/89 LER #: 89-017-01 REPORT DATE: 03/14/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: POWER LEVEL:

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: H. Robinson, Tech Functions TELEPHONE: (201) 316-7563

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On July 11, 1989 at 0055 hours, the Main Generator tripped due to a phase differential condition caused by a fault in the operating main output transformer (the other main transformer failed on June 25, 1989). When the generator tripped, a turbine trip signal was generated which resulted in an anticipatory reactor scram. The plant was cooled down utilizing the main condenser and the Shutdown Cooling System and reached the cold shutdown condition at 0950 hours. The cause of this event was equipment failure. Examination of the transformer determined that an internal winding had failed, causing the phase differential condition which caused the generator trip. The plant responded as designed and operator action was prompt and appropriate. This transient was within the design basis of the plant and had no safety significance. The entire Electrical system was evaluated for adverse effects due to the fault, and an evaluation was completed to determine if a generic problem existed between the two failed transformers and the other power transformers at

the station. As a result, it was determined the failure was confined to the two main output transformers and did not involve any other transformers. The plant was returned to power operation on July 19, 1989 using the spare transformer installed due to the previous failure of the other Main Output Transformer.

END OF ABSTRACT

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Date of Occurrence

The event described within this report occurred on July 11, 1989.

Identification of Occurrence

An electrical fault on one of the main output transformers (CFI-XFMR) tripped the Main Generator (EIIS-EL) causing the reactor to automatically shutdown due to an anticipatory reactor scram signal. This event is considered reportable in accordance with 10CFR50.73 (A) (2) (iv).

Conditions Prior to Occurrence

The reactor was at 57% power, with a generator load of approximately 332 megawatts (electric). Power was limited due to the failure of one of the main output transformers which occurred on June 25, 1989.

Description of Occurrence

On July 11, 1989 at 0055 hours, the Main Generator tripped due to a phase differential condition caused by a fault in the remaining main output transformer. When the generator tripped, a turbine trip signal was generated which resulted in an anticipatory reactor scram. The automatic actions that occurred were expected for this type of transient. Operators controlled reactor pressure and level within the normal post trip bands and plant cooldown was then controlled utilizing the main condenser bypass valves. The plant reached the cold shutdown condition at 0950 hours.

Apparent Cause of Occurrence

The cause of this event was equipment failure. Examination of the transformer determined that an internal winding had failed, causing the phase differential condition which caused the generator trip. The cause for failure of the transformer winding was investigated under long term corrective actions.

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Analysis of Occurrence and Safety Significance

The Post Transient Review Group was convened to review this event. The review determined that the plant responded as designed and operator action was prompt and appropriate. This transient was within the design basis of the plant and had no safety significance.

Corrective Action

Short Term

1. The Main Output Transformer was disconnected from the distribution system and the entire Electrical System was evaluated for adverse effects due to the fault. No adverse effects were identified.
2. Since this was the second main transformer to fail within one month, an investigation was conducted to determine if a generic problem existed between the two failed transformers and the other power transformers at the station. No problems outside of the main output transformers were identified as a result of this investigation.
3. The plant was returned to power operation on July 19, 1989 using the spare transformer installed due to the previous failure of the other Main Output Transformer.

Long Term

The failed Main Output Transformers were inspected on July 14, and 15, 1989 by a General Electric representative and an outside consultant specializing in power transformers. The inspection revealed significant thermal degradation on the winding insulation with some spots worn down to bare copper. Failure of the first transformer started as a turn-to-turn fault on the Phase "B" winding, and then developed into phase-to-phase failure and finally failed to ground. Failure of the second transformer started as Phase "A" to ground fault and then Phase "A" to "B".

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During the 12R refueling outage, (9/88 - 4/89), both transformers were drained and inspected. The inspection noted the bottom oil boxes had been partially ruptured and support jacking blocks were loose. GE Service Shop personnel repaired the oil boxes and spaced and jacked the

windings down to the original factory pressure. The transformers were refilled with new oil.

The failure mechanism is attributed to thermally aged windings and increased pressure on the brittle insulation. Windings were degraded due to improper oil flow as a result of ruptured oil boxes. Re-establishment of jacking pressure combined with movement of the windings caused damage and subsequent failure of the brittle turn insulation.

Similar Events

LER 86-004: "Reactor Scram on Anticipatory Turbine Trip"

LER 89-016 "Main Transformer Failure Causes Automatic Reactor Shutdown"

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ATTACHMENT 1 TO 9003260545 PAGE 1 OF 1

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March 14, 1990

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Licensee Event Report

This letter forwards one (1) copy of Supplement one (1) to Licensee Event Report (LER) No. 89-17, Revision 1. This revision provides additional information which is indicated by a bar in the right hand margin.

Very truly yours,

E. E. Fitzpatrick
Vice President & Director

Oyster Creek

EEF:KB:jc
(0705A:03)
Enclosures

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